

What is claimed is:

1. A method of forming an image on a card, comprising the steps of:

printing an image on a card by an ink jet printing method by using a sublimable dye ink while feeding the card, the card having a substrate layer, an ink-fixing layer laminated on a surface of the substrate layer, and an ink image-receiving layer peelably laminated on a surface of the ink-fixing layer, whereby the sublimable dye ink is caused to be held by the ink image-receiving layer;

conveying the card to a heating source; and  
subjecting the card to heat treatment by the heating source to thereby cause diffusion of the sublimable dye ink held in the ink image-receiving layer in the ink-fixing layer and color development to form an image; and

peeling the ink image-receiving layer off the card after the heat treatment.

2. A method according to claim 1, wherein the ink-fixing layer and the ink image-receiving layer are formed on each of a front surface and a back surface of the card, and

wherein the step of printing includes:

a first printing step of printing an image on one of the front surface and the back surface of the card while feeding the card;

an inverting step of inverting the printed card upside down; and

a second printing step of printing an image on another of the front surface and the back surface of the card while feeding the inverted card,

wherein the step of heating includes heating the front surface and the back surface of the card simultaneously by the heating source, and

wherein the step of peeling includes peeling the ink image-receiving layer off the each of the front surface and the back surface of the card.

3. A method according to claim 1 or 2, wherein a fluorine film layer is laminated between the ink-fixing layer and the ink image-receiving layer.

4. A method according to claim 1 or 2, wherein the ink image-receiving layer is formed of a material which is made easily peelable by application of heat.

5. A method according to claim 1 or 2, wherein the step of heating includes causing the card to pass by the heating source being driven for heating, at a constant speed.

6. A method according to claim 1 or 2, wherein the heating source is formed by a halogen lamp.

7. A method of forming an image on a card having a substrate layer, and an ink-fixing layer laminated on the surface of the substrate layer, comprising the steps of:

printing an image on a transfer sheet by an ink jet printing method by using a sublimable dye ink while unrolling and feeding a roll of the transfer sheet, the transfer sheet having a substrate layer, and an ink image-receiving layer laminated on a surface of the substrate layer, whereby the sublimable dye ink is caused to be held by the ink image-receiving layer;

affixing the transfer sheet to the card by pressure while applying heat thereto, with an image-formed portion of the transfer sheet and the ink-fixing layer of the card being positioned and overlaid upon

each other, thereby causing diffusion of the sublimable dye ink held in the ink image-receiving layer in the ink-fixing layer and color development to form an image; and

peeling the transfer sheet off the card by taking up the transfer sheet into a roll.

8. A method according to claim 7, wherein the step of printing includes printing a mirror image on the transfer sheet such that an image transferred therefrom onto the card forms a normal image.

9. A method according to claim 7, wherein a fluorine film layer is laminated on a surface of the ink-fixing layer of the card.

10. A method according to claim 7, wherein the step of affixing the transfer sheet to the card by pressure while applying heat thereto includes sandwiching the transfer sheet and the card overlaid upon each other between a pair of rollers, and advancing the transfer sheet and the card simultaneously at a constant speed in accordance with rotation of the rollers, at least one of the rollers toward the transfer sheet being a heating roller.

11. A method according to claim 7, wherein the step of affixing the transfer sheet to the card by pressure while applying heat thereto includes hot-pressing the image-formed portion of the transfer sheet and the card which are overlaid upon each other.

12. An apparatus for forming an image on a card, comprising:

conveyor means for conveying a card along a transport passage, the card having a substrate layer, an ink-fixing layer laminated on a surface of the substrate layer, and an ink image-receiving layer

peelably laminated on a surface of the ink-fixing layer;

printing means arranged to face the transport passage, for printing an image on the card in synchronism with feed of the card by an ink jet printing method by using a sublimable dye ink to thereby cause the sublimable dye ink to be held by the ink image-receiving layer;

heating means arranged to face the transport passage, for applying heat treatment to the printed card to thereby cause diffusion of the sublimable dye ink held in the ink image-receiving layer in the ink-fixing layer to form an image; and

a single casing for accommodating said conveyor means, said printing means, and said heating means.

13. An apparatus according to claim 12, a fluorine film layer is laminated between the ink-fixing layer and the ink image-receiving layer.

14. An apparatus according to claim 12, wherein the ink image-receiving layer is formed of a material which is made easily peelable by application of heat.

15. An apparatus according to claim 12, further including card supply means for storing a plurality of the cards in a stacked fashion and supplying the cards one by one to said conveyor means.

16. An apparatus according to claim 12, wherein said conveyor means includes:

printer-block conveyor means arranged in a manner associated with said printing means;

heater-block conveyor means arranged in a manner associated with said heating means; and

transfer means for transferring the card from said printer-block conveyor means to said heater-block

conveyor means.

17. An apparatus according to claim 16, wherein said printer-block conveyor means includes:

a suction table for sucking and holding the card on a surface thereof by suction air, and

a printer-block conveyor belt mechanism for conveying the card via said suction table.

18. An apparatus according to claim 16, wherein the card has an identical laminate structure on both of a front surface and a back surface of the substrate layer, and

wherein said printer-block conveyor means is capable of conveying the card in both of a forward direction and a reverse direction, and includes inverting means for inverting the card upside down, said inverting means being arranged either on a proximal end side or on a distal end side of said printer-block conveyor means in a direction of feed of the card in a manner facing said transport passage.

19. An apparatus according to claim 18, wherein said inverting means includes:

a catcher capable of receiving the card from said printer-block conveyor means and passing the card to said printer-block conveyor means,

an inverting mechanism for inverting the card upside down via said catcher, and

a sender roller for sending the card from said catcher.

20. An apparatus according to claim 19, wherein said inverting means also serves as said transfer means, and

wherein said sender roller is capable of rotating in both of normal and reverse directions, and

wherein said catcher is arranged between said printer-block conveyor means and said heater-block conveyor means on said transport passage, and capable of cooperating with said sender roller to send the card in an inverted position to said heater-block conveyor means.

21. An apparatus according to claim 16, wherein said transfer means includes:

a catcher arranged on said transport passage between said printer-block conveyor means and said heater-block conveyor means such that said catcher is capable of receiving and passing the card, and

a sender roller for sending the card from said catcher to said heater-block conveyor means.

22. An apparatus according to claim 16, further including control means for controlling said heating means and said heater-block conveyor means, and

wherein said control means causes said heater-block conveyor means to convey the card such that the card passes by said heating means being driven for heating, at a constant speed.

23. An apparatus according to claim 22, wherein said control means is capable of changing a speed at which said card is conveyed.

24. An apparatus according to claim 12, wherein said heating means is formed by a halogen lamp.

25. An apparatus according to claim 12, wherein said heating means is formed by a pair of halogen lamps arranged on opposite sides of said transport passage in a manner parallel and opposed to each other.

26. An apparatus according to claim 16, wherein said heater-block conveyor means includes:

transport guides arranged along said transport

passage for guiding the card while supporting the card by left and right side ends of the card, and

a pushing mechanism for pushing the card guided by said transport guides, from behind.

27. An apparatus according to claim 26, wherein said pushing mechanism is formed by a heater-block conveyor belt mechanism having pushing pawls formed on a surface thereof.

28. An apparatus according to claim 26, wherein said heating means is formed by a pair of halogen lamps arranged on opposite sides of said transport passage in a manner parallel and opposite to each other,

said heater-block conveyor belt mechanism having a conveyor belt stretched for revolving around one of said halogen lamps.

29. An apparatus according to claim 26, wherein said conveyor belt of said heater-block conveyor belt mechanism is stretched such that said conveyor belt faces a magnetic encoder portion of the card carried thereon.

30. An apparatus for forming an image on a card, comprising:

sheet feed means for feeding a transfer sheet along a traveling passage, said transfer sheet having a substrate layer, and an ink image-receiving layer laminated on a surface of the ink image-receiving layer;

printing means arranged to face said traveling passage, for printing an image on the transfer sheet in synchronism with feed of the transfer sheet, by an ink jet printing method by using a sublimable dye ink;

card conveyor means for conveying a card along a transport passage, the card having a substrate layer,

and an ink-fixing layer laminated on a surface of the substrate layer; and

thermal pressing means arranged to face a confluent portion of said traveling passage and said transport passage, for positioning and overlaying an image-formed portion of the transfer sheet to the ink-fixing layer of the card, and affixing the transfer sheet to the card by pressure while applying heat thereto, to thereby cause diffusion of the sublimable dye ink held in the ink image-receiving layer in the ink-fixing layer and color development to form an image;

peeling means arranged at a location downstream of said thermal pressing means, for peeling the transfer sheet off the card; and

a single casing for accommodating said sheet feed means, said printing means, said card conveyor means, said thermal pressing means, and said peeling means.

31. An apparatus according to claim 30, wherein said printing means prints a mirror image of the image on the transfer sheet such that an image transferred therefrom onto the card forms a normal image.

32. An apparatus according to claim 30, wherein a fluorine film layer is laminated on a surface of said ink-fixing layer of the card.

33. An apparatus according to claim 30, further including card supply means for storing a plurality of the cards in a stacked fashion and supplying the cards one by one to said card conveyor means.

34. An apparatus according to claim 31, wherein said sheet feed means includes a supply reel for unrolling a roll of the transfer sheet wound therearound, and a take-up reel for taking up the



transfer sheet unrolled, . . .

wherein the transfer sheet is unrolled from said supply reel, sent along said traveling passage, peeled off the card, and then taken up by said take-up reel.

35. An apparatus according to claim 34, wherein said traveling passage is formed by a cartridge casing, and wherein said supply reel, said take-up reel, and the transfer sheet are accommodated in said cartridge casing to form a sheet cartridge.

36. An apparatus according to claim 31, wherein said thermal pressing means comprises a pair of rollers which sandwich the transfer sheet and the card overlaid upon each other therebetween, and advances the sheet and the card at a constant speed in accordance with rotation thereof, at least one of the rollers toward the transfer sheet being a heating roller.

37. An apparatus according to claim 31, wherein said thermal pressing means is formed by a hot-pressing mechanism for sandwiching an image-formed portion of the transfer sheet and the card overlaid upon each other, and applying heat thereto.